LIGHTSPACE®
INTELLIGENT LIGHTING CONTROLS

LT-0620P

Intelligent Dimmer Rack

User's Manual

Note: This manual includes the instruction and specification documents for installation of the intelligent lighting control equipment by our company. Among them, the requirements on installation and wiring of equipment must be fully complied in installation and debug practices.

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Delivery - unpacking

Upon receipt of LIGHTSPACE® products, make sure that the packaging is unopened, and examine your equipment carefully for completeness;
Any equipment cannot leave the factory until it is confirmed in perfect condition after strict inspection.
If you observe any damage, contact relative parties, and have your complaint duly recorded.

Check whether what you have received is in conformity with your order and the specifications of the product series;
Check the quantity and equipment model are in conformity with the delivery notice;
In the event of any error, contact your shipper immediately to clarify the situation until receiving full satisfaction.

If you find nothing wrong, replacing the product in the packing and store it in a place suitable for storage, while waiting for final installation.

Generalities - Safety

LT-0620P is professional fully digital dimmer built in accordance with European safety standard series EN 60439.
It is a Class I equipment designed and manufactured according to EN 60439 and requires imperatively a safety earth connection in compliance with local regulations.
To prevent any risk of electric shock, do not remove any cover or part of the enclosure. Access to internal parts is not required for normal operation.
If damaged, equipment must be repaired and maintained by professional service personnel exclusively. Disconnect from the power supply prior to the opening for inspection or maintenance.

WARNING!
LETHAL VOLTAGES ARE PRESENT INSIDE! PAY ATTENTION TO YOUR SAFETY! INSTALLATION, DEBUG, AND MAINTENANCE MUST BE OPERATED BY PROFESSIONAL PERSONNEL!
EVERY USER SHOULD READ THE MANUAL CAREFULLY BEFORE OPREATION AND COMPLY WITH THE REQUIREMENTS.

Important Notice for Cables

Power supply cables and connectors are important parts of your equipment and contribute to its safety.

- Always use a main circuit breaker, or fuses at power supply terminal of the cables to interrupt the power supply; never touch or contact the power cables;
- Ensure no damage to the cable and the connectors, check them with no damage at each installation or at regular intervals;
- Do not tie together cables and signal lines.

Main Functions

- 6 × dimmed outputs at 20A
- One20A MCB for each channel
- Applicable to distributed intelligent lighting control system
- Compatible with LT-NET signal and DMX-512 signal
- One group of 12V DC voltage output for control system
- LED indications for three phase power supply, and one LED for communication indication;
- 128 preset scenes
- 128 divided zone;
- Fade time: 1～100s;
- Super thyristors and fast electromagnetic switch reduce probability of thyristor burn-out by short-circuit.
- Each channel is provided with one professional grade filter(100us) for efficient attenuation of lamp filament noise.
- Automatic voltage limiting function keeps voltage output within 230V to extend service life of lamps;
- Applicable to control of incandescent lamps, tungsten halogen lamps, and transformer-fed low voltage lamps;.

Product Characteristics

Control electronics:	full digital, microprocessor controlled;
Ratings:	dimmers rated for continuous duty: 6 x 4 kW; Max. duty of LT-0620P 24 kW;
Operating environment:	0℃ to 40℃; Relative humidity max. ： 90% at 25℃; Atmospheric pressure ： < 106 kP.
Power supply system:	3NPE 400V 50Hz (TN-S system, neutral directly connected to earth, 230V between phase and neutral); Reduced-size N linear diameter is not allowed; Single-phase operation is possible (single-pole protected);
Supply voltage range:	230 V±10 %;
Rated supply current:	Star system 3-phase 3N with PE supply: 40A per phase at 230V; Single-phase supply: 120A at 230V;
Dimmer protection:	MCB mini breaker (Max. breaking capacity 6000A);
Control signal inputs:	DMX and LT-NET signal can be switched over by internal position selector switch;
DMX control signal:	correct DMX signal is continuous flash;
LT-NET control signal:	correct LT-NET signal is red and green alternately;
DC supply for panels:	12V/0.2A;

DMX Address: initial address of dimmers can be set by handheld programmer (the position selector switch should be pulled down when setting);

Front panel indicators: power is OK or not for each channel (MCB trip);
DMX512 or LT-NET control signal is OK or not (LED indication for communication);
Power supply failure (LED indication for power supply);

Dimmer test functions: When emergency button is pressed, internal trimmer potentiometer can be applied to dimming within 0 to 100% range for 6 channels;

Response time: DMX≤30ms;

Dimmer resolution: 256 steps;

Power semiconductors: antiparallel thyristors;

Min. load per dimmer: ≥60W

DC component in output voltage: below 1V in rated load range;

Types of load: suitable for incandescent lamps, tungsten halogen lamps, and transformer-led low voltage lamps;

Color code for supply cable: brown and/or black for phases L1, L2, L3;
Blue for neutral N;
Yellow/green for earth PE;

Electromagnetic compatibility standard: EN55103-1: 1996;
EN55103-2:1996;

Safety standard: EN60439，EN60950

Protection:

(1) Protection for each channel by MCB (breaking capacity 6kA) to ensure safe operation of system under rated conditions;

(2) Power supply ingoing line diameter: 25mm^2 for rigid wire, 16mm^2 for stranded wire;

(3) Load terminal outgoing line diameter: 10mm^2 for rigid wire, 6mm^2 for stranded wire;

(4) Cables enter from the knockout cable hole at the top of the enclosure, or from the cable entry in the rear plate;

(5) The terminal of control signal lines enter from the cable hole at the bottom.

Communication:

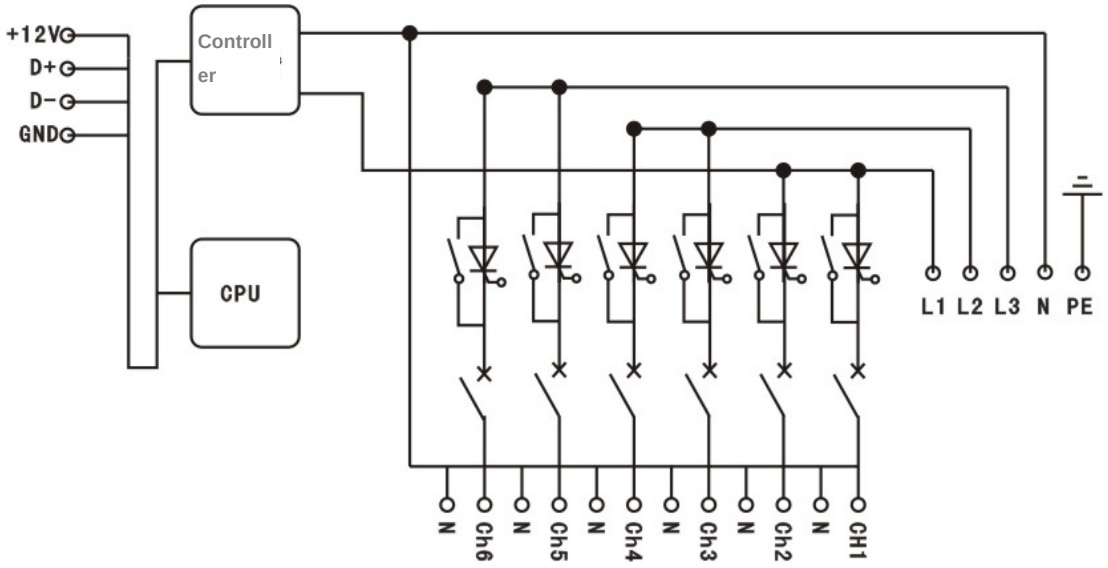
(1) DMX512/1990 communication protocol;

(2) LT-NET interface protocol.

Cooling:

Convection cooling via the lateral aluminum heat sink;

Electrical diagram as follows:



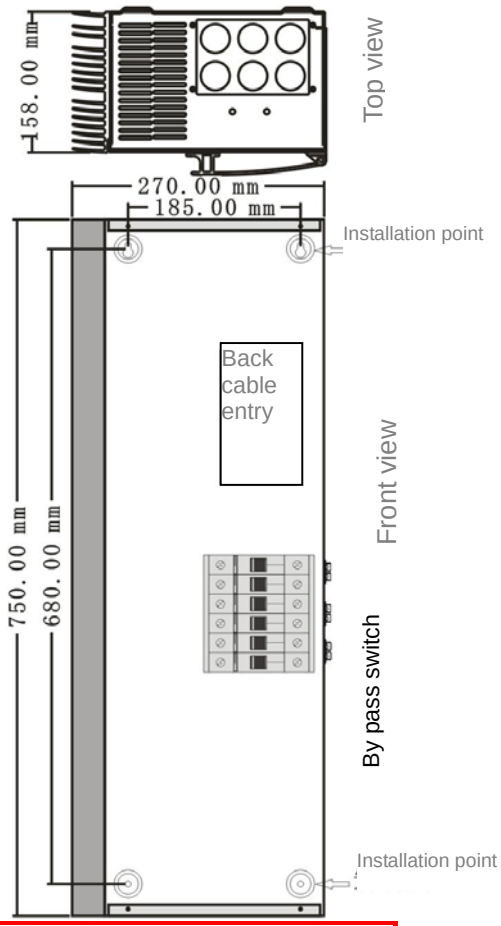
Installation requirements

LT-0620P is professional equipment, which must be installed and debugged by professional personnel.

Outside dimensions: 270 (width) X 750 (height) X 158 (depth);
Power supply: 230 V±10 %　50Hz TN-S system;
Input interface and control signal: RS485 interface for LT-NET signal or DMX-512 signal.

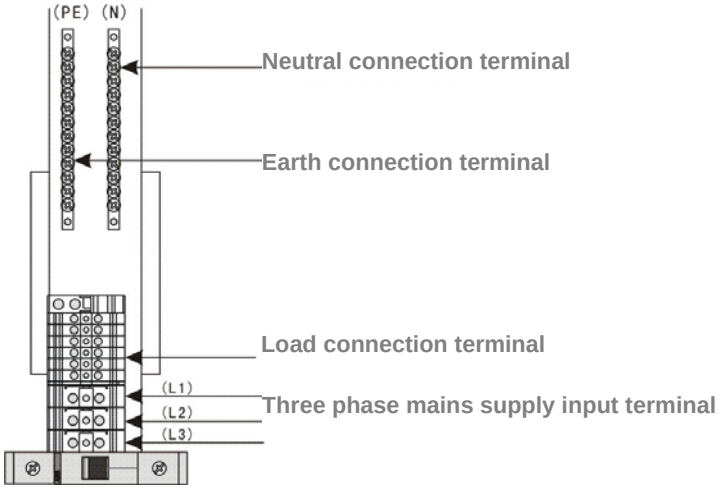
The dimmer can be installed at lighting site, distribution room, or in distribution cabinet with good ventilation. The dimmer should be frontally mounted against a wall, vertical to the ground.

There are 4 mounting holes in the back of the dimmer. Fix the dimmer on a mounting rack via a Φ6 screw or mount it on the wall via a Φ6 expansion bolt. See the figure of installation and dimensions for details.



WARNING!

Inappropriate power supply connection can lead to irreparable damage on LT-0620P. Users must check the power supply and make sure the N line of the power supply is connected with N busbar of the dimmer.



A. Requirements on operating environment of the dimmer:

(1) Operating environment temperature is 0—40℃, humidity range is 5—90%;

(2) No erosive or polluted gas is allowed in the environment;

(3) Good ventilation should be provided;

(4) High power electrical equipment should not be located nearby.

A distance should be kept between adjacent dimmers to ensure sufficient airflow along heat sinks and enough space for pipes and cables.

B. Dimensions requirements for dimmer installation:

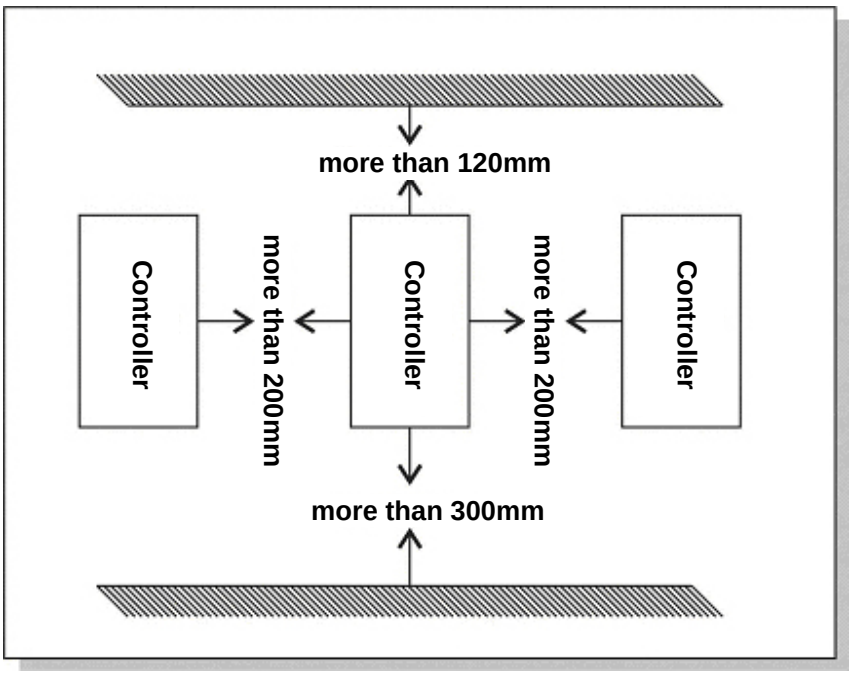
(1) Distance between two dimmers should be more than 200mm;

(2) Distance between the top of the dimmer and the cable tray should be more than 120mm;

(3) Distance between the dimmer bottom and the cable tray should be more than 300mm;

(4) Distance between the dimmer bottom and the ground should be more than 300mm.

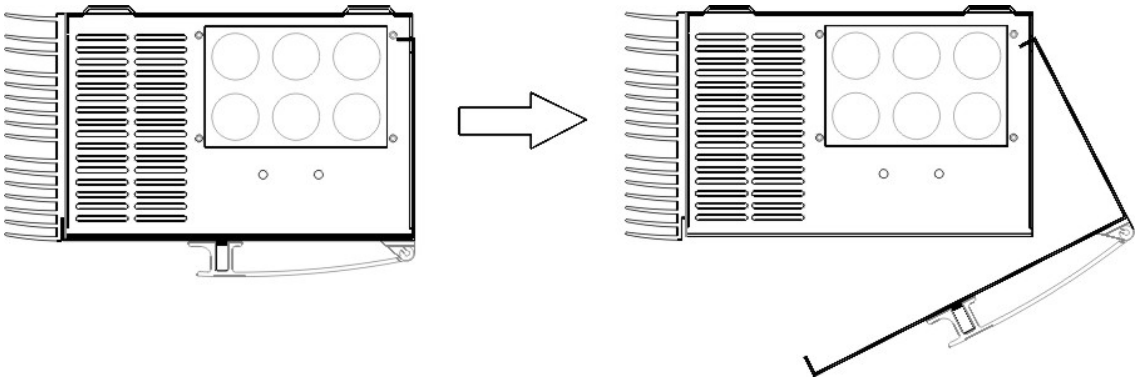
Suggestions:
Independent MCB is provided at the power supply terminal of each dimmer.



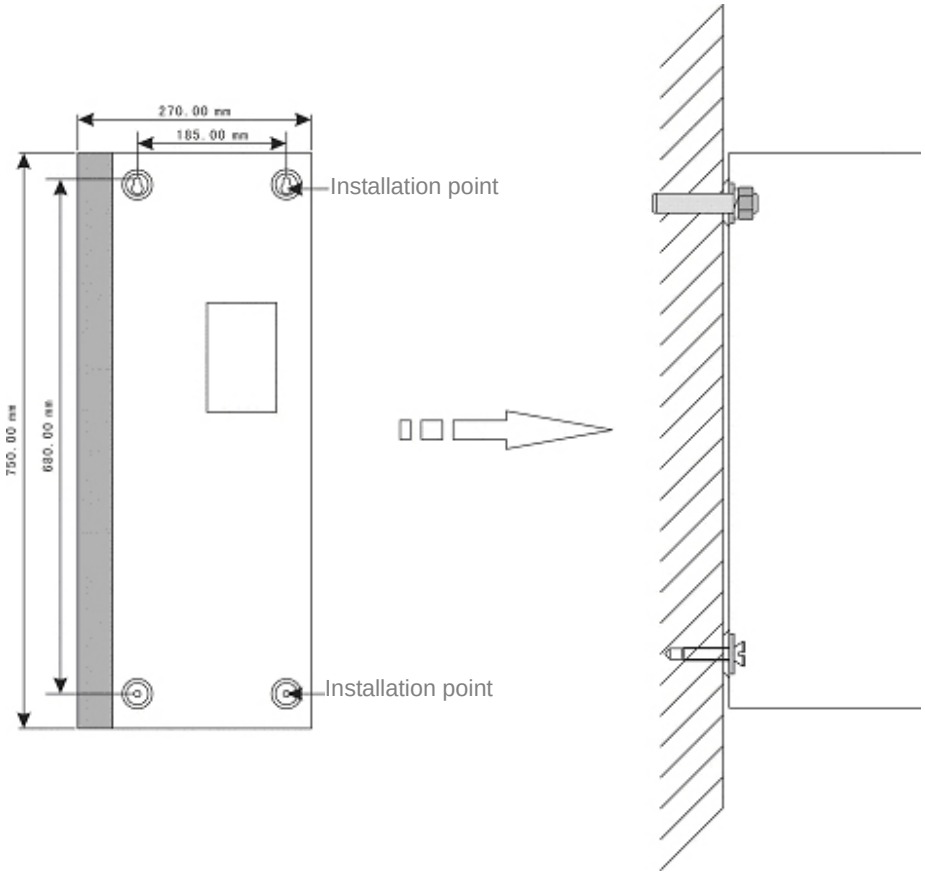
C. Mounting of the controller

First remove the front panel of the controller with care, as shown in the figure:

Remove the front panel



Mounting holes are located at four corners in the back of the controller. The controller is mounted against the wall, via a Φ6 expansion bolt at the top, and a Φ8 expansion bolt and screw at the bottom. Screw length outside the panel bottom after installation should be less than 50mm.



Power supply connection

WARNING!
Only professional personnel are allowed to open the cover to prevent electric shock.
Professional personnel are required for repair and maintenance if any fault; please make sure power supply is disconnected before repair and maintenance.

A. Type of mains supply network

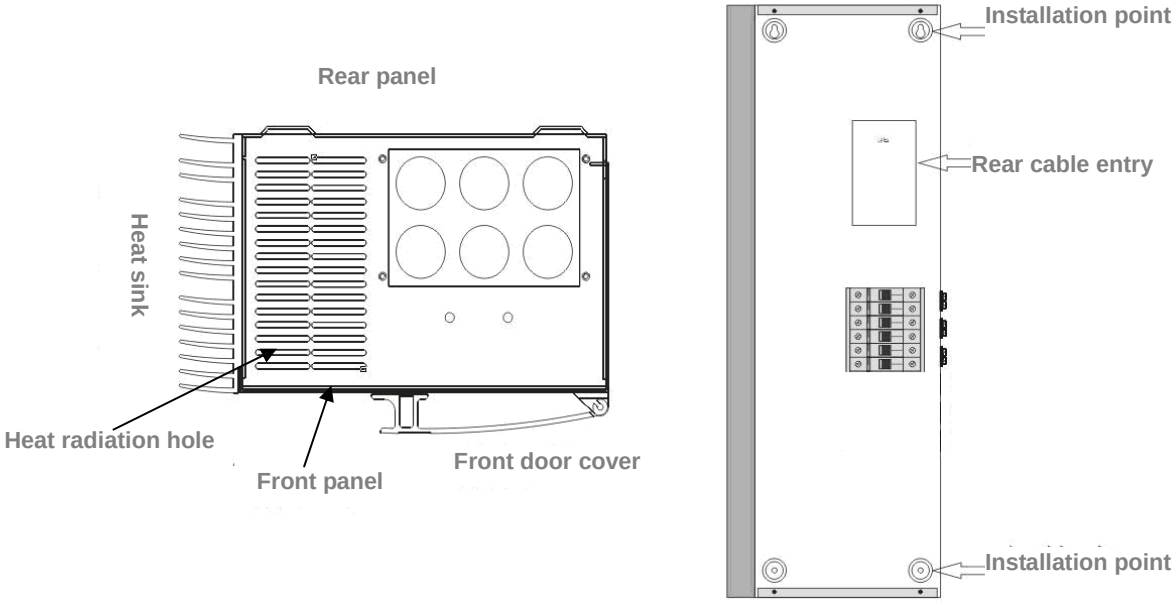
(1) Before equipment is connected, verify the location of the suitable mains supply at your venue;
(2) Before connection, make sure if any inrush current 10 times the rating is present in the mains;
(3) If in doubt, consult the electrician or the utility company;
(4) The standard LT-0620P is suitable for a three phase 3NPE 400V 50Hz , TN-S system (three phase wires + Neutral wire + earth wire);
(5) The rated voltage between phase and Neutral is 230V;
(6) The operating voltage range is 230 V ±10% ;
(7) LT-0620P can be operated on a single phase supply.

B. Power supply cable connection requirements

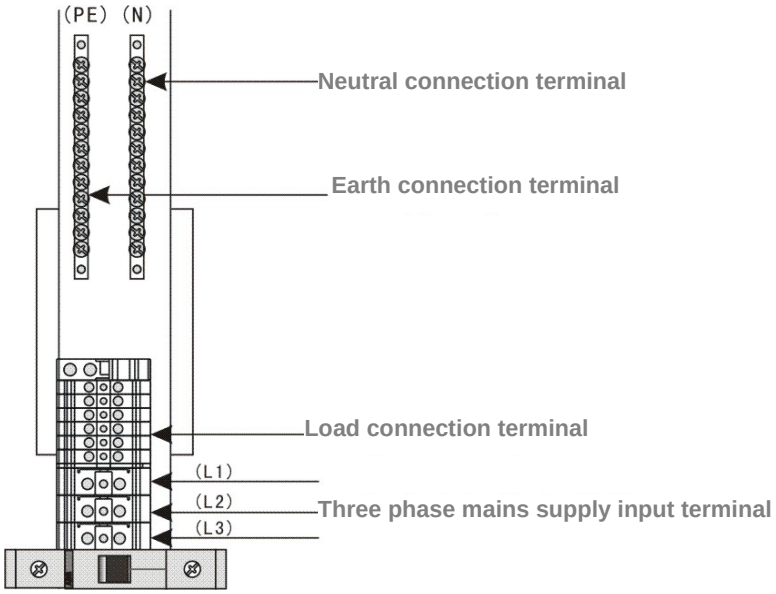
(1) LT-0620P and its supply cable must be adequately protected against overload and short-circuit by the installation; verify the current edition of the applicable wiring regulations.
(2) All connections should be performed by a qualified electrician;
(3) The supply terminals are suitable for 4~16 mm^2 stranded wire or 2.5~25mm^2 rigid wire;
(4) The color code is blue for Neutral and yellow/green for PE;
(5) Connect cables via the knockout hole at the top of the dimmer, or via the cable entry in the back;
(6) The diameter of the Neutral wire must at least be equal to that of the phases; reduced-diameter Neutral wires are dangerous and are not allowed;
(7) All supply cables and extension cables should have all conductors under the same sleeve, in order to reduce unwanted interferences to audio and video equipment;
(8) The supply cable should be sized for the rating of LT-0620P;
(9) Cables under the current ratings are not allowed.

C. Connection port

As shown in the figure:



D. Operation on a star system (400 V, 3N~ with PE)



E. Single-phase conversion:

LT-0620P can be operated on a single-phase supply, it can be operated on the single-phase supply only after L1, L2, L3 are linked via a professional bridge connector.

Notice: When LT-0620P is operated on the single-phase supply, users must check cable specification to make sure it is allowed for single-phase protection.(N line diameter is not less than that of phases)

F. Output connection:

The outgoing cables to the luminaries are connected to the load connection terminal.

(1) Load (output), Neutral (N), and protection earth (PE) terminals are supplied for each dimmer;

(2) All load terminals are evenly arranged on load connection terminal, wire size should be suitable for the terminals;

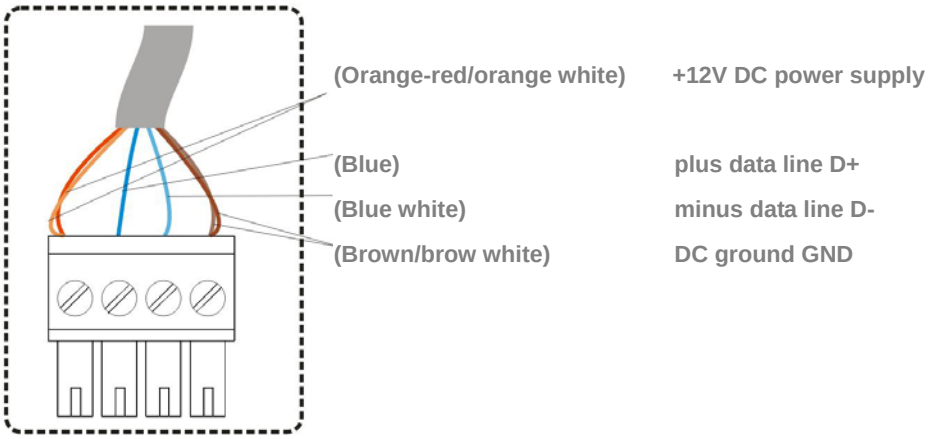
(3) 4 kW dimmer should use 4 mm^2 above stranded wire or 2.5 mm^2 above rigid wire.

WARNING!
Make sure no short-circuit exists at load side, and N and PE line are reliably connected!

Control signal connection and cable layout

LT-0620P can be controlled by a lighting control desk via DMX512 signal; It can also be controlled by LT-NET signal or central control system compatible with the LT-NET signal. All equipment including dimmer, control panel, and control components are daisy chained via one control cable. If system is large, then it is divided into several subsystem connected via network bridge to main trunk control.

Signal transmission is via Cat. 5 shielded twisted pair (STP. Cat 5), function of twisted pair in control cable is shown in the figure.



A. DMX512 / 1990 signal control:

(1) DMX512 standard is issued by USITT, is internationally most widely accepted communication standard for lighting control equipment.DMX512 signal is a digital multiplexed control signal, suitable for the digital transmission of the levels of up to 512 dimmers;

(2) The interface uses the RS-485 (EIA-485) standard, which states: wire pairs + screen; maximum 32 receivers on a line;

(3) Cable length without reamplification max. 300m;

(4) Transmission rate is high (250kbit/s), dimmer levels are sent in bytes of 8 bits (256 levels).

B. LT-NET signal control:

(1) LT-NET is a communication network designed by our company for application to intelligent lighting control system, it can be used in two-way communication;

(2) The interface uses RS-485 (EIA-485) standard, maximum 32 terminal equipment on a line; cable length (without reamplification) max. 1000m.

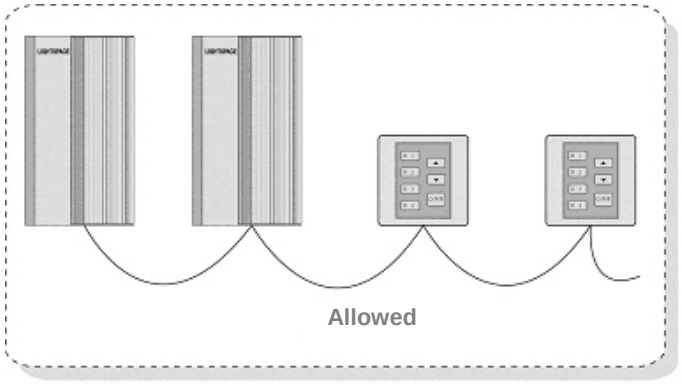
Brief introduction of the protocol: high transmission rate (9600 bps), 10 bits per byte: one bit for start (0), 8 bits for data (low order is in front), one bit for stop (1), a group of instruction consists of 7 bytes: the first byte is start code 1CH, the second byte is zone code (each channel has its own zone code, only execute instructions with its zone code), the third byte is instruction code, the fourth to sixth bytes are instruction internal codes, the seventh code is verification code, which is supplementary code (complement sum of 1 to 6 bytes, and plus 1) of former six bytes. Please contact our company for detailed information.

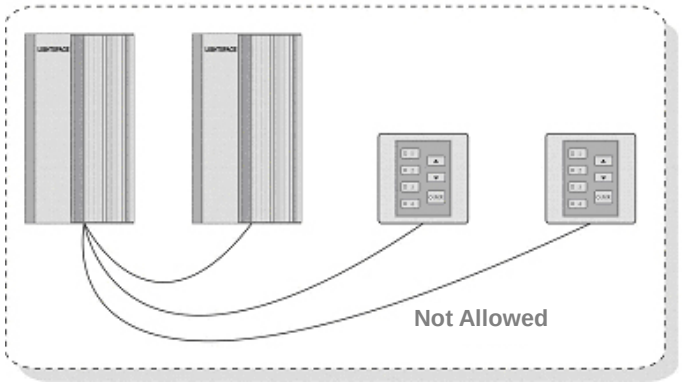
C. Connection standard of control cables

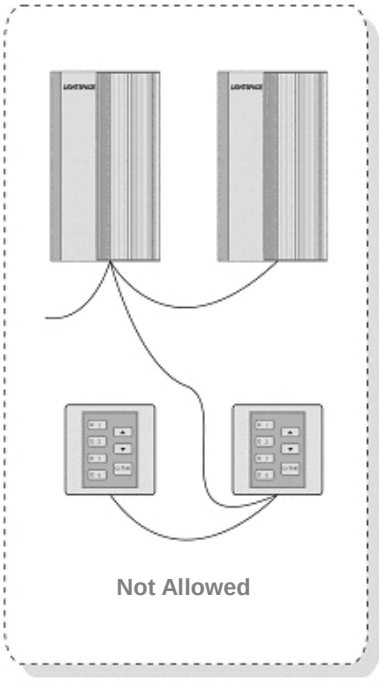
Control network can be built through connection of control cable terminals welded on the main board of LT-0620P.

The control network starts from one of equipment sets, runs to the nearest equipment via a first cable. The second cable is used to connect with the input terminal of the control cable for next equipment (daisy chain). In all equipment, input and output of control cables are wired in parallel. Close loop, star connection, or Y splitting should be avoided.

The continuity and quality of control signal will not be affected when one equipment set in connection is started or switch off, or when a failure occurs. In the last dimmer unit connected, input terminal of control cable must be connected with termination resistor.

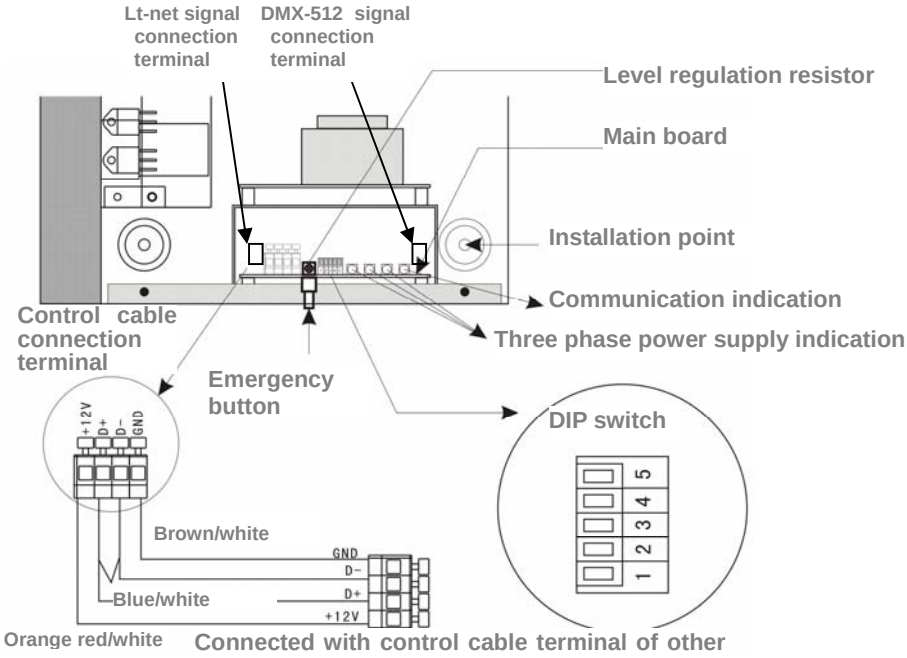






Option of operation status and mode

A. Operation status and mode of LT-0620P depend on the position of selector of DIP switch on main board



(1) Switch selector 1 is in up position indicates that the equipment is under check status, in level adjustment mode; down position indicates that it is in switch-off mode. Lighting density value is controlled by level regulation resistor;

(2) The switch selector 2 is in up position indicates that the equipment is in normal operation, down position indicates check status;

(3) The switch selector 3 is in up position indicates that the equipment is working in DMX512 network, down position indicates LT-NET network;

(4) The switch selector 4 is in up position indicates that the equipment is in normal operation, down position indicates on-line address setting status;

(5) The switch selector 5 is in down position indicates that RS-485 of the equipment is connected with termination resistor, up position indicates disconnection.

B. Three phase power supply indication: three LED indicators show the operation status of each phase respectively.

C. Communication indication

(1) DMX512: continuous flash of LED indicates that the current DMX signal input is normal;

(2) LT-NET: alternative change of LED between red and green indicates that the current LT-NET signal input is normal.

D. Bypass Switch

When there is something wrong with the function mode . Please make the Bypass Switch closed.

WARNING!

YOU MUST BE OPERATING IN THE CORRECT WAY WHEN YOU NEED TO USED THE BYPASS SWITCH!

THE METHOD OF OPERATEING BYPASS SWITCH:

（1）CUT OFF THE MCB OF THE CHANNEL WHICH NEEDS TO SWITCH

（2） CLOSE THE BYPASS SWITCH OF THE CHANNEL

（3） CLOSE THE MCB OF THE CHANNEL

E. Phase distribution of dimmer

(1) Output of channel 1～2 is supplied from phase L1;

(2) Output of channel 3～4 is supplied from phase L2;

(3) Output of channel 5～6 is supplied from phase L3;

(4) Electronic part of microprocessor is supplied from phase L1.

F. Opt-isolation

Control cable input of LT-0620P equipment is equipped with opt-coupler isolation. This provides galvanic isolation between the network and LT-0620P microprocessor electronics. This is an important safety feature: If, for example, the network comes in contact with 230V mains voltage, then the internal electronics of LT-0620P will remain isolated from those dangerous voltages. Such accident could occur when cables are damaged or crushed, or when insulation of equipment is not normal.

Various check, protection, restore methods

WARNING!
LETHAL VOLTAGES ARE PRESENT INSIDE!
DANGER!PAY ATTENTION TO YOUR SAFETY!
INSTALLATION, DEBUG, AND MAINTENANCE MUST BE OPERATED BY PROFESSIONAL PERSONNEL!

A. Please do not open the cover to prevent electric shock. Refer inspection or maintenance to professional personnel in case of any damage. Please make sure power supply is disconnected before inspection and maintenance.

B. Notice: check mains supply voltage before connecting equipment. If voltage is higher than the rated voltage, internal control module may be damaged, and fuse in internal transformer may be blown.

C. DMX signal lost: press down emergency button, the equipment comes into direct-through status (level can be preset by level regulation resistor), control on-off of each channel by MCBs on the front panel for emergency.

D. MCB abnormal switch-off: close again the switch to check if it is successful, if not, a failure must exist in circuit, then check the circuit; If MCB trips again after keeping closed for some time, please check if overload occurs.

E. Internal fuse: if there is no LED indication in the front panel, check the fuse in control module, this fuse is not related to MCBs on the front panel.(Qualified professionals are required for operation):

(1) Disconnect mains supply for LT-0620P;
(2) Remove the front panel;
(3) Check 1A fuse on power supply board F (5x20mm), change the component of the same type if any damage;
(4) Check mains supply (it is possible that phase and neutral lines are inversed or neutral is broken);
(5) Make sure the mains supply is normal; restore power supply to LT-0620P.

F. Note:

(1) It is dangerous to use wrong fuse, the equipment may be damaged permanently;
(2) Contact our company for service, maintenance should be carried out under guide of a professional engineer;
(3) Lethal voltage is present in the equipment, trained professionals are required for service;
(4) Disconnect power supply before opening the cover;
(5) Power supply must be disconnected before changing fuses;
(6) Contact the supplier if components are to be changed.

User's Manual for LT-0620P intelligent dimmer rack, third edition, 2009

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